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Antitumor activity of nanoliposomes encapsulating the novobiocin analogue 6BrCaQ in a triple-negative breast cancer model in mice

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Abstract

In this study, we investigated the anticancer efficacy of pegylated liposomes containing 6BrCaQ, an hsp90 inhibitor derived from novobiocin. 6BrCaQ has been previously identified as the most potent compound in a series of quinoleic novobiocin analogs but is poorly water-soluble. We investigated, for the first time, the anti-proliferative effects of this drug in vivo in an orthotopic breast cancer model (MDA-MB-231 luc) using pegylated liposomes to allow its administration. Hsp90, hsp70 and hsp27 protein and mRNA expressions were not strongly affected after treatment meaning it did not induce a heat shock response often associated with resistance and poor prognosis. Liposomal delivery of 6BrCaQ retarded tumour growth at a low dose (1 mg/kg, injected once a week for 4 weeks). Histological analysis of tumours revealed necrosis and a lower proportion of proliferative cells in treated mice indicating that this drug has potential for breast cancer therapy when encapsulated in liposomes.

Keywords: Novobiocin analogue, hsp90, liposomes, drug delivery, orthotopic